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# 7 The archaeological and archaeobotanical implications of a destruction layer in Dun Bharabhat, Lewis

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## Introduction

Dr. Euan MacKie is not immediately associated with archaeobotany. However, one of his many major publications, *Dun Mor Vaul: An Iron Age broch on Tiree* (MacKie 1974) contained one of the first modern archaeobotanical reports in Atlantic Scotland (Renfrew 1974), analysing a cache of burnt six-row barley (*Hordeum vulgare* L.) Research across the region has since confirmed six-row barley as the staple cereal crop of the Iron Age and earlier (Boyd 1988; Dickson & Dickson 2000).

The 25 years since the publication of *Dun Mor Vaul* have seen Atlantic Scotland at the forefront of environmental archaeological research in Britain. A number of long-term interdisciplinary research campaigns have been undertaken, with strong emphasis on palaeoenvironmental and palaeoeconomic reconstruction. These campaigns have focused on single settlement complexes and their immediate environs (e.g. Howe, Ballin Smith 1994 (**colour plate 5**); Old Scatness, Nicholson & Dockrill 1998) and wider regional investigations (e.g. SEARCH in the Western Isles, Gilbertson *et al.* 1996). Archaeobotany, the study of the human/plant interaction of the past (van Zeist *et al.* 1991), has played a key role in reconstructing the way human groups viewed, managed and used the plant resource within these research campaigns (cf. Bond & Hunter 1987; Dickson 1994; Boardman 1995; Holden & Boardman 1998; Smith 1999).

Dun Bharabhat, a complex Atlantic roundhouse in a small loch in the Bhaltois Peninsula, West Lewis, was excavated between 1985–7 as part of the wider research campaign of the University of Edinburgh, the Calanais Archaeological Research Project (CARP, Harding 2000). This paper outlines the archaeological and archaeobotanical implications of a destruction layer in the secondary occupation of the roundhouse. These implications are then discussed with regard to the regional context of the Atlantic Scottish Iron Age.

## The site

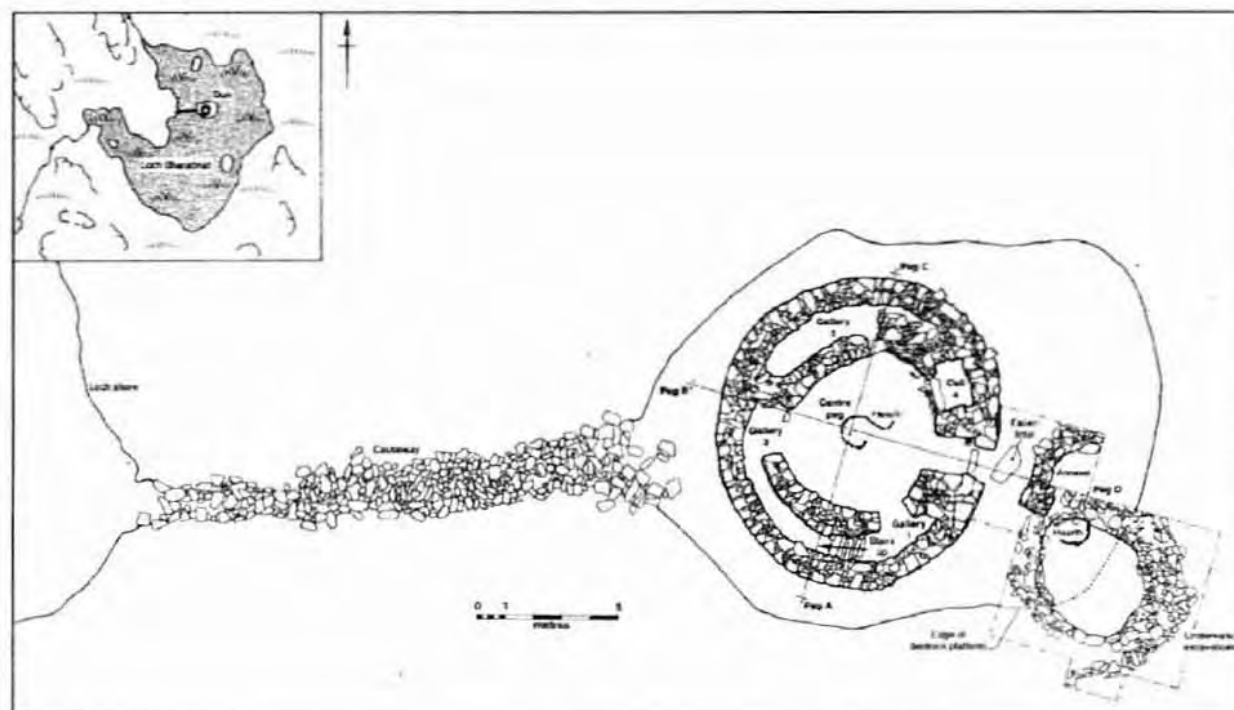
The first research campaign of CARP saw excavation of three Iron Age sites on the Bhaltois Peninsula on the west coast of Lewis (4). At the time of excavation the sites were seen to

represent the main Iron Age settlement forms common throughout the Western Isles (Harding & Armit 1990): an 'island dun' at Dun Bharabhat (Harding & Dixon 2000), a 'broch' at Loch na Beirgh (Harding & Gilmour 2000) and a wheelhouse and cellular complex at Traigh Cnìp (Armit 1996). Excavations at the three sites initially characterised the form and date of the structures with the eventual aim of comparing their structural, artefactual and ecofactual sequences to create an integrated socio-economic model for the area (cf. Ceron-Carrasco *et al.* 2001).

Dun Bharabhat is located in one of the small lochs dotted throughout the hilly interior of the peninsula. The present loch catchment area comprises a *Calluna* rich heathland (Pankhurst & Mullin 1994) and bare rock, suitable for rough grazing. The Holocene vegetation history has been reconstructed through a pollen profile taken from the loch sediments and detrital mud (Lomax & Edwards 2000). At approximately 3700 14C BP (at the start of the Bronze Age), a major loss of relatively mixed woodland occurred, with a rapid spread of heathland taxa and evidence of arable and pastoral activity within the area. Erosional disturbance increased through the late Bronze Age and Iron Age, presumably as a direct result of the islet occupation and associated settlement. A small rise in arboreal taxa, including Scots Pine (*Pinus sylvestris* L.), oak (*Quercus* sp.) and alder (*Alnus* sp.) occurred during the mid to late Iron Age. This tree pollen may be secondarily derived from erosion of the surrounding soil (*ibid.*, 111), or may represent woodland regeneration in the form of a localised copse or small extent of woodland within the catchment.

The excavations concentrated on the roundhouse interior and an adjacent structure that had slumped into the loch and therefore required underwater investigation. Initial clearance of the rubble demonstrated that the roundhouse wall was double-skinned with intra-mural galleries (23), identifying the site as a complex Atlantic roundhouse (after Armit 1992). The terrestrial structural sequence begins with ephemeral early Iron Age activity, before the construction of the complex Atlantic roundhouse. This, in turn, was modified to form a simple cellular unit, which used the interior of the roundhouse and a remodelled gallery. Radiocarbon dating of timbers in a destruction layer of the secondary occupation indicates the roundhouse was occupied within the second half of the first millennium BC (see below for further discussion).

This destruction layer was readily identified during excavation and comprised thick deposits of interleaved orange ash, substantial fragments of charred timber and bands of carbonised material. Burnt bone and pottery were found throughout the horizon that covered nearly all of the internal space of the secondary occupation (Harding & Dixon 2000, 20). Only *judgement* samples were taken (Jones M, 1991), including representative fragments of the charred timber and a single bulk sample of carbonised material (C.169) immediately overlying and interspersed with the timber. On analysis, C.169 was rich in barley straw (Church 2000; see below). The most likely explanation for this horizon is the remains of a conflagration of the roof and organic superstructure. The timber fragments, some up to 0.6m in length, were radially orientated, the configuration expected for collapsed roof timbers (Gordon Thomas pers. comm.). It is likely that the barley straw represents part of the roofing thatch. The orange ash stems from the burning of peat or turf (Peters *et al.* 2001), representing a further component of the roof material or flooring material burnt by the conflagration in a situation similar to that observed at Scalloway (Carter 1998).



23 Plan of principal features of Dun Bharabhat, Lewis

## The dating of the event

Radiocarbon dates from two separate charred timbers were obtained from the secondary occupation destruction layer (**Table 6**). When calibrated using OxCal (Version 3.5, Bronk-Ramsey, 2000 based on atmospheric data from Stuiver *et al.* 1998) the dates do not extend later than the first century AD and could encompass a much earlier evaluation. These dates have important implications for the chronology of Iron Age settlement in the region. Firstly they have been used to demonstrate early secondary occupation of Atlantic roundhouses. More significantly, some researchers have seen these dates, in conjunction with the other date from the pre-roundhouse level, bracketing the construction and occupation of the complex Atlantic roundhouse to the mid to late first millennium BC (Armit 1996 117; Harding & Dixon 2000, 26-7; Gilmour 2001). This represents a considerably earlier date than the conventional assignment of these structures to the end of the first millennium BC and first millennium AD (cf. MacKie 1971; Parker-Pearson & Sharples 1999 355-360). However, a number of problems exist for this early dating. Firstly, three radiocarbon dates is a small number from which a site sequence can be proposed, let alone an important component of a revised framework for the region, a fact acknowledged by the excavators (Harding & Dixon 2000, 26). Also, none of the dates are directly associated with the primary occupation of the roundhouse. However, this is a factor of the availability of sufficient material for the bulk radiocarbon dating employed a decade ago. Modern advances in radiocarbon dating mean AMS dating of cereal grain recovered from the primary occupation of the roundhouse (Church 2000, 130) could provide more definitive dating.

The second major problem involves the material dated. The pre-roundhouse date came from a single piece of unidentified timber, whilst the two later dates again came from single



pieces of timber, presumably of either Scots Pine (*Pinus sylvestris* L.) or spruce (*Picea* sp.) judging by the identifications made of comparable timber samples (see below). Whilst avoiding the problems of bulk dating through the use of single entities (cf. Ashmore 1999) the use of these timbers raises other problems. Firstly timber would have been a very valued resource in the area by the Iron Age. It can be envisaged that timber would be kept for as long as possible, with perhaps forms of curatorship of timber involving re-use over several generations. More significantly, the age ranges of the pine and spruce were at least 95 and 75 years respectively but none of these ring-counts represented the total age of the tree from heartwood to bark (Church 2000, 126-127). Furthermore, the spruce must have been driftwood (see below) and may have been spent many years since within the Atlantic, especially if derived from Siberia via the Arctic (Dickson 1992). Therefore single entity dating of these timbers is not dating the point of conflagration. It is instead dating an accumulation of annual growth rings of trees that could have been over 100 years old and died many decades before their final incorporation into the superstructure of the secondary occupation. This means the actual conflagration could have occurred at least a century or so later than indicated by the radiocarbon dates. Therefore a significant chronological adjustment in the context of Atlantic roundhouse development may be required.

## **The nature of the conflagration**

Destruction deposits are usually implicitly assumed to be the result of an accident. However, at Dun Bharabhat it is probable that the secondary structure was allowed to burn. This is suggested through the nature of the deposits; the timbers and straw thatch would have been carbonised through slow burning over a number of hours within reduced atmospheric conditions, a situation most likely to have occurred within a mound of collapsed roofing and structural material. Timber would have been a very valued resource (Ceron-Carrasco *et al.* 2001) so it seems unlikely that no effort would have been made to save as much wood as possible if accidental firing of the structure occurred. Of course, if the firing was an act of aggression then the occupants may have been killed or had fled and so could not put out the fire, allowing the debris to smoulder for days. An alternative hypothesis is that the conflagration was a deliberate act of closure incorporating conspicuous consumption of a valued resource, as the final act in the 'life cycle' of the secondary occupation building. Indeed, no further occupation of the roundhouse interior occurred after the conflagration, though activity continued elsewhere on the islet and external underwater cell. This concept of a 'life cycle' for structures is beginning to emerge with evidence for structured deposition at foundation levels of buildings at a range of sites (Parker-Pearson and Sharples 1999; Sharples 2001). These include the 'ritual' pits underlying the primary floor levels at the wheelhouse at Sollas (Campbell 1991) and one of the 'figure-of-eight' houses at Bostadh (Neighbour & Burgess 1997). Also, a thick peat horizon was uncovered at the foundations of the cellular buildings at Loch na Beirgh (Harding and Gilmour 2000), perhaps indicating a metaphoric link to the moorland zone, an important economic hinterland for the inhabitants of the structures.

## Archaeobotanical implications

The detailed analysis of the archaeobotanical material from the destruction layer has already been outlined (Church 2000). All the plant macrofossils, from the thatch to the burnt timber, were very well preserved. For example, the degree of preservation for all the grain from the barley thatch (C.169) was compared to grain from a number of other archaeobotanical assemblages from Lewis (Table 7), using indices formulated by Hubbard (1990). Over 65 per cent of the grain from C.169 lay within the two best preservation classes, indicating near perfect preservation, whereas generally over 50 per cent of the grain from the other assemblages lay within the two worst preservation classes, indicating severe degradation of the grain. This allowed much more detailed identification to be made for C.169 than is usually possible for material derived from the occupation levels from Atlantic Scottish sites. The excellent preservation stems from the carbonisation process that occurred during the conflagration of the roof. The roof, if left to burn, would eventually have collapsed inwards, providing excellent conditions for slow carbonisation of plant material at a relatively low heat, within a reducing atmosphere (G. Thomas, pers. comm). Experimental work by Boardman and Jones (1990) has shown that these conditions produce the best preservation, in terms of density, condition and the range of plant parts, many of which (the chaff, culms and seeds) would be destroyed in higher temperatures.

The destruction level is also important in terms of its archaeobotanical taphonomy, as we can confidently relate the assemblages to specific sets of plant remains. For example, the burnt timbers were certainly used as structural components, whilst the cereal rich C.169 has been interpreted as a barley thatch, though it may represent bedding, flooring or stored straw within the loft or roof of the structure. The key issue is the relative lack of mixing with other plant material from human behavioural episodes of discard (Jones G, 1991). This mixing is an unquantifiable process that represents the biggest interpretative problem of archaeobotanical assemblages stemming from carbonisation in the domestic hearths of Atlantic Scotland (Church & Peters 2001). Analysis of individual components and lenses of material from destruction levels therefore avoids this taphonomic problem, so a more confident and detailed analysis of issues such as timber procurement and arable agriculture is possible.

### Timber

Five hand-retrieved samples were taken of the burnt timber. C.169 also contained fragments of burnt timber. The timber comprised Scots Pine (*Pinus sylvestris* L.) and spruce (*Picea* sp.), with small amounts of birch (*Betula* sp.), ling heather (*Calluna vulgaris* L. Hull) and rootwood of indeterminate taxa. The timber was in excellent condition allowing identification of most fragments, including ring counts. The birch and ling displayed comparatively low ring counts, with the highest counts being 16 and 8 respectively. Also, all the fragments were of roundwood suggesting that small branches and twigs were present within the roof, perhaps as furnishings such as heather rope or birch wattle. Both these taxa would have been available locally (Lomax & Edwards 2000). The pine seems to have been of a greater age than the spruce, with the highest counts being 95 and 75 respectively. Further morphological characteristics provide information on the nature and origin of the timber. Several of the spruce fragments contained bore holes, indicating the use of driftwood (Malmros 1994; Taylor

1999). This seems to be the likely source for the spruce, as the taxon was non-native to the British Isles during the Iron Age. The timber could have drifted from North America or even Siberia, having first been transported through the Arctic (Dickson 1992). The pine did not exhibit any sign of boreholes and bark fragments were recovered from C.169. Also, the ring pattern from the larger pine fragments was very narrow, which suggests the tree was growing in stressed conditions. This evidence, coupled with the presence of Scots Pine pollen in the contemporary subzone from the loch core (*ibid.*, 2000), points to the use of locally-derived timber. Therefore the procurement strategies for timber were both opportunistic, in terms of the driftwood, and also potentially managed, in the case of the locally-derived pine.

### *Thatch*

As stated above, C.169 contained a high density of very well-preserved carbonised cereal plant macrofossils (**Table 8**). Much of the plant material was derived from cereal straw including nodes, bases and thousands of culm fragments. The assemblage was therefore interpreted as a possible fragment of thatch. The straw crop seems to be a mix of six-row hulled barley (*Hordeum vulgare* var. *vulgare* L.) and two-row hulled barley (*Hordeum distichum* var. *vulgare* L.). From the proportions of the rachis fragments, 73 per cent of the assemblage was six-row with 27 per cent two-row. Also, in two-row barley only symmetric grain is produced whereas six-row barley produces asymmetric and symmetric grain in a ratio of 2:1. Hence, the ratio of 1.4:1 within C.169 confirms a mix of six-row and two-row barley, with the six-row species dominant. The identification of two-row barley is surprisingly rare within the Atlantic Scottish Iron Age. This is partly because of the relative rarity in survival of those features (sterile lateral spikelet and rachis internode) which are used to differentiate the species, but also may suggest sophisticated management of the arable resource through selective cultivation of specific species and variants for different functions. For example, the presence of two-row barley in the thatch may represent particular qualities the straw from this species exhibit. Conversely, six-row barley may have been preferred for consumption, as it would have provided a greater grain yield per hectare. Some of this six-row barley would have become carbonised in the domestic hearths, mostly through 'graddening' (Fenton 1978) and cooking accidents, which subsequently became incorporated into ash spreads, floors and middens. It is these remains that comprise much of the archaeobotanical assemblages across Atlantic Scotland, potentially creating a bias towards a perceived monoculture of six-row barley in the region during most of the Iron Age.

The crop seems to have been harvested by uprooting, due to the high number of culm bases of both cereals and smaller monocotyledons and weed associations with low lying plants, such as violets (*Viola* sp.) The straw would have been removed early in the crop-processing, in the threshing stage for example. This is confirmed by the ratio between the culm bases and the basal rachises (4.6:1), which shows that most of the ears were separated from the straw prior to its use as thatch. Hence, an estimate can be made of approximately 80 per cent efficiency for the separation of the ear from the straw during early crop-processing.

The presence of wild taxa within the straw relates largely to weed contamination of the crop. Heather furnishings, such as rope or twine, can explain the limited presence of heathland taxa, such as *Erica/Calluna* spp. The remaining taxa are all common weeds of cultivation and dry grassland. The presence of Chickweed (*Stellaria media* L. Vill.) indicates relatively nitroge-



nous soil conditions, presumably enhanced through the addition of animal manure and seaweed to the soil. Several of the species, including Ray's knotgrass (*Polygonum oxyspermum* Meyer & Bunge ex Ledeb.), Bulbous buttercup (*Ranunculus bulbosus* L.) and Wild turnip (*Brassica rapa* L.) have strong associations with machair grassland (Pankhurst & Mullin 1994). This evidence, coupled with a second series of pollen sequences from Loch na Beirgh (Lomax 1997), points to the cultivation of the barley crop occurring largely within the machair grassland behind Traigh na Beirgh (4). The presence of Wild turnip within samples from the occupation levels in Dun Bharabhat and the later phases at Cnip and Loch na Beirgh may also point to the repeated use of the machair as the primary environment for arable cultivation (Church 2000; Ceron-Carrasco *et al.* 2001).

## Other sites in Atlantic Scotland

The destruction layer from Dun Bharabhat demonstrates the increased level of archaeological and archaeobotanical interpretation which is possible from conflagrations. A review of the literature relating to the Atlantic Scottish Iron Age highlights the surprising infrequency of such deposits (**Table 9**). This is probably a product of a number of factors including archaeological recognition, climatic constraints, and site formation and erosion processes.

The conflagration at Scalloway (Sharples 1998) marked the end of the primary occupation of the complex Atlantic roundhouse. It was recognised archaeologically through the widespread evidence of interleaved ash and charcoal. Soil micromorphological analysis (Carter 1998) suggested that this 'red ash layer' represented not the remains of the roof as first thought but rather the burnt remains of the organic floor material built up during the final period of occupation. The roof material itself was thought to have either burnt away completely or been removed, as a deliberate action or as a product of the re-occupation.

The extensive excavations at the Howe, Orkney (Ballin Smith 1994) (**colour plate 4**) uncovered the highest frequency of conflagrations at a single site. Fires occurred in both secondary occupation levels within the broch and also at different points of the middle Iron Age external occupation. Detailed sampling and archaeobotanical analysis (Dickson 1994) of these conflagrations provided a wealth of information on the plant materials used in the structure. Little explanation is given for the cause of the fires except for the conflagration in the rampart cells of the north-west building. This may represent a deliberate firing of the cell roofs as part of a closure episode, for the fire was prevented from spreading into the main house and the cells then fell out of use for the remainder of the period.

Turning to the Western Isles, recent excavations at Bornais, South Uist (Sharples 2000) have revealed a conflagration horizon of a probable wheelhouse, which was replaced by a rectilinear structure. Archaeobotanical research, including the analysis of several burnt timber planks, is ongoing. Further structural information was also recovered at the excavations at Loch na Beirgh, Lewis (Harding & Gilmour 2000), preserved by the waterlogged conditions of the lowest levels of the Cellular Period (second-fourth centuries cal AD) rather than carbonisation (see below).

Research in the Inner Hebrides has also produced two sites with conflagrations, both excavated by Mackie. At Dun Mor Vaul, Tiree (MacKie 1974) excavations revealed



ephemeral evidence of a conflagration of an early Iron Age structure underlying the main complex Atlantic roundhouse, including a cache of burnt barley grain (Renfrew 1974) and an *in situ* carbonised post. The conflagration at Dun Ardtreck is much more substantial, with a thick layer of charcoal and ash across much of the site interpreted as a major structural fire (MacKie forthcoming). The partial excavation of a 'vitrified dun' at Langwell in Sutherland also revealed the extensive remains of a major structural fire, including what appear to be several radially orientated roofing timbers (Nisbet 1995).

A number of important points are raised by this brief review. Firstly, there is a recurring theme in the way that these fires signal the end, or perhaps the beginning, of a period of occupation on the site. Many of these conflagration deposits are followed by a period of abandonment, sometimes signalling the final major archaeological episode on the site, as at Dun Bharabhat and Langwell. The other sites that continue to be occupied or re-occupied at a later date all display major structural or spatial re-organisation, for example at Scalloway, Bornais and the Howe, Orkney. The conflagration could also mark a deliberate action to clear or 'cleanse' the site prior to re-occupation. Therefore, these conflagrations, no matter what their cause, mark major changes in the way these sites are used, viewed or lived in by their occupants i.e. an episode of closure or re-birth in the life-history of the structure.

As argued above, it is probable that timber within these deposits was specifically chosen for some form of structural component of the building. This provides information on the type of tree or shrub used and its likely source within the wider economic landscape. The issue of timber procurement is seen as an important economic consideration throughout Iron Age Atlantic Scotland (Fojut 2001), with some researchers viewing timber availability as a possible stimulus for social and structural change (cf. wheelhouses Armit 1992, 1996). The identifications made of timber from a variety of site types from the middle Iron Age through to the late Iron Age show that timber procurement was based upon the gathering of driftwood, such as spruce (*Picea* sp.), and the use of smaller timbers of species that could have been obtained locally, such as willow (*Salix* sp.) and hazel (*Corylus* sp.). Indeed, it has been argued from the preliminary analysis of hazel wattle-work from Loch na Beirgh that the remains stemmed from a local, coppiced woodland (Church forthcoming). This pattern of procurement does not require large-scale trade networks of timber and the consequent trade deficits would result in an island – mainland axis. However, none of the evidence directly relates to the superstructure of the Atlantic roundhouse, the monument theoretically requiring the greatest volume of timber. Instead the evidence is derived from a wheelhouse (Bornais) and smaller cellular units within 1) the shell of abandoned roundhouses (e.g. Dun Bharabhat) or 2) external buildings to the roundhouses at their time of occupation (e.g. Howe). Hence, timber procurement within the middle Iron Age (the *floruit* of complex Atlantic roundhouses) may have required a trade in timber. The likely presence of *in situ* substantial timber remains from the primary and secondary roundhouses at Loch na Beirgh represents an unique opportunity to address this important issue in detail. Other site types, such as vitrified forts (e.g. Rahoy, Argyll, Childe & Thorneycroft 1938) and waterlogged sites, such as the external structure at Dun Bharabhat, are also important site types to address this question of timber procurement.

Conflagration deposits provide a valuable resource for future research into the human/plant relationship in Atlantic Scotland. For example, Dickson provided very detailed

identifications from the Howe, Orkney from the five conflagration levels on the site, which now rest in the site archive. Amongst these are a number of samples with direct weed associations with the barley thatch that would allow estimations of the position of the arable component within the wider landscape. As argued above, this is generally not possible because of the inherent taphonomic problems within Atlantic Scotland's archaeobotany (Church & Peters 2001). Further comparison between the different phases, both qualitative and quantitative, could highlight issues of continuity or change. Re-analysis could also occur onsite, with the opening of old excavation trenches followed by detailed sampling at sites with little archaeobotanical analysis, as part of their final publication (e.g. Langwell). This detailed sampling would include the use of techniques with a proven ability to answer questions pertinent to understanding these conflagration deposits, such as soil micromorphology (Carter 1998), mineral magnetism (Batt & Dockrill 1998; Peters *et al.* 2000, 2001) and archaeobotany (Dickson 1994; Church 2000).

## **Conclusion**

This paper has outlined the archaeological and archaeobotanical implications from a conflagration at the end of the secondary occupation of Dun Bharabhat, Lewis. This analysis and review of other similar deposits has highlighted the importance of conflagration deposits to the archaeobotany of the Atlantic Scottish Iron Age. Three key conclusions can be drawn from this analysis and review, as follows:

While it is difficult to identify the mechanism and nature of the conflagration from the available evidence, it is important to consider the alternative hypotheses of aggression and deliberate episodes in the life history of the building, as well as the usual interpretation of accidental firing.

Analysis of individual components and lenses of material from destruction levels avoids the problems of taphonomic mixing, characteristic of most archaeobotanical assemblages from the region. More confident and detailed analysis of issues such as timber procurement and arable agriculture should be possible.

The identifications made of timber from a variety of site types from the middle Iron Age through to the late Iron Age show that timber procurement was based upon the gathering of driftwood, such as spruce (*Picea* sp.), and the use of smaller timbers of species that could have been obtained locally, such as willow (*Salix* sp.) and hazel (*Corylus* sp.). Complex trade networks for timber procurement need not be invoked, although the evidence stems from smaller cellular units rather than larger structures, such as the Atlantic roundhouses.